

CLAIMS

Sub 47 1. A method for fairly servicing, by a request servicing device, electronic requests received by the request servicing device from request generating devices interconnected with the request receiving device, the method comprising:

establishing a pricing tier for each request generating device, a maximum rate of request servicing, and an expected time for serving a request at the maximum rate of request servicing;

for each request generating device with a premium pricing tier, maintaining an instantaneous rate of request servicing by the request servicing device;

following servicing of each request from a request generating device by the request servicing device,

determining a time elapsed during servicing of the request;

when the time elapsed during servicing of the request is less than the expected time for serving a request established for the request generating device,

calculating a remaining time equal to the difference between expected time for serving a request established for the request generating device and the time elapsed during servicing of the request; and

waiting for a length of time based on the calculated remaining time prior to servicing another request for the request generating device.

2. The method of claim 1 wherein the length of time based on the calculated remaining time is determined to be:

the calculated remaining time for a request generating device for which the established pricing tier is a basic pricing tier;

the calculated remaining time for a request generating device for which the established pricing tier is a premium pricing tier and the instantaneous rate of request servicing is equal to the maximum rate of request servicing established for the request generating device;

greater than the calculated remaining time for a request generating device for which the established pricing tier is a premium pricing tier and the instantaneous rate of

request servicing is greater than the maximum rate of request servicing established for the request generating device; and

less than the calculated remaining time for a request generating device for which the established pricing tier is a premium pricing tier and the instantaneous rate of request servicing is less than the maximum rate of request servicing established for the request generating device.

3. The method of claim 2 wherein the request generating device is a computer.

4. The method of claim 2 wherein the request servicing device is an electronic data storage device.

5. The method of claim 4 wherein the electronic data storage device is a disk array.

6. The method of claim 6 wherein the maximum rate of request servicing is established via specification of a maximum rate of request servicing by the request generating device.

7. The method of claim 1 wherein the maximum rate of request servicing is established by partitioning the capacity of the request servicing device among the request generating devices in order to provide, when possible, each request generating device with a maximum rate of request servicing specified by the request generating device, and otherwise to provide each request generating device with a maximum rate of request servicing proportional to a maximum rate of request servicing specified by the request generating device.

8. The method of claim 1 wherein the request servicing device may dynamically alter the maximum rate of request servicing provided to one or more request generating devices in accordance with a rate at which the request servicing device receives requests and according to the request servicing capacity of the request serving device.

9. The method of claim 1 wherein maintaining an instantaneous rate of request servicing by the request servicing device further comprises:

initially setting the instantaneous rate of request servicing for a request generating device to one request divided by the expected time for serving a request at the maximum rate of request servicing established for the request generating device;

increasing the instantaneous rate of request servicing for the request generating device by one following servicing of a request generated by the request generating device; and

decreasing the instantaneous rate of request servicing for the request generating device by one at regular intervals of time.

10. A request servicing device that fairly services electronic requests received by the request servicing device from request generating devices interconnected with the request receiving device, the request servicing device including:

a memory that contains an established maximum rate of request servicing, an expected time for serving a request at the maximum rate of request servicing, and a pricing tier for each request generating device and that contains, for each request generating device with a premium pricing tier, an instantaneous rate of request servicing by the request servicing device; and

control functionality that services electronic requests received from the request generating devices and that, following servicing of each request from a request generating device by the request servicing device, determines a time elapsed during servicing of the request so that, when the time elapsed during servicing of the request is less than the expected time for serving a request established for the request generating device, the control functionality calculates a remaining time equal to the difference between expected time for serving a request established for the request generating device and the time elapsed during servicing of the request and waits for a length of time based on the calculated remaining time prior to servicing another request for the request generating device.

11. The request servicing device of claim 1 wherein the length of time based on the calculated remaining time is determined by the request servicing device to be:

the calculated remaining time for a request generating device for which the established pricing tier is a basic pricing tier;

the calculated remaining time for a request generating device for which the established pricing tier is a premium pricing tier and the instantaneous rate of request servicing is equal to the maximum rate of request servicing established for the request generating device;

greater than the calculated remaining time for a request generating device for which the established pricing tier is a premium pricing tier and the instantaneous rate of request servicing is greater than the maximum rate of request servicing established for the request generating device; and

less than the calculated remaining time for a request generating device for which the established pricing tier is a premium pricing tier and the instantaneous rate of request servicing is less than the maximum rate of request servicing established for the request generating device.

12. The request servicing device of claim 10 wherein the request generating device is a computer.

13. The request servicing device of claim 10 wherein the request servicing device is an electronic data storage device.

14. The request servicing device of claim 10 wherein the electronic data storage device is a disk array.

15. The request servicing device of claim 10 wherein the maximum rate of request servicing is established via specification of a maximum rate of request servicing by the request generating device.

16. The request servicing device of claim 10 wherein the maximum rate of request servicing is established by partitioning the capacity of the request servicing device among the request generating devices in order to provide, when possible, each request

generating device with a maximum rate of request servicing specified by the request generating device, and otherwise to provide each request generating device with a maximum rate of request servicing proportional to a maximum rate of request servicing specified by the request generating device.

17. The request servicing device of claim 10 wherein the request servicing device may dynamically alter the maximum rate of request servicing provided to one or more request generating devices in accordance with a rate at which the request servicing device receives requests and according to the request servicing capacity of the request serving device.

18. The request servicing device of claim 10 wherein maintaining an instantaneous rate of request servicing by the request servicing device further comprises:

initially setting the instantaneous rate of request servicing for a request generating device to one request divided by the expected time for serving a request at the maximum rate of request servicing established for the request generating device;

increasing the instantaneous rate of request servicing for the request generating device by one following servicing of a request generated by the request generating device; and

decreasing the instantaneous rate of request servicing for the request generating device by one at regular intervals of time.

19. The request servicing device of claim 18 wherein separate execution threads in a firmware or software implementation of control functionality within the request servicing device increase the instantaneous rate of request servicing and decrease the instantaneous rate of request servicing.

20. The request servicing device of claim 10 wherein the length of time based on the calculated remaining time determined by the request servicing device to be greater than the calculated remaining time for a request generating device is further determined to be a ratio multiplied by the calculated remaining time, the ratio calculated by

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